5x1 HDMI / HDBT Multimedia Presentation Switch

Installation Guide

500435

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SAFETY PRECAUTIONS

To insure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water. Keep the product away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Using supplies or parts not meeting the product's specifications may cause damage, deterioration or malfunction.
- Refer all servicing to qualified service personnel.
- Install the device in a place with good ventilation to avoid damage caused by overheat.
- Unplug the power cord when left unused for a long period of time.
- Do not put any heavy items on the unit or on extension cable.
- Do not remove the housing of the device as you may be exposed you to dangerous voltage or other hazards.
- Do not twist or pull by force ends of the UTP cable. It can cause malfunction.
- Information on disposal of devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.
- Unpack the equipment carefully and save the original box and packing material for possible future shipment

NOTICE:

1. Please read this user manual carefully before using this product.
2. The "far-end" item is the device (e.g. display device, 3rd party RS232 device etc.) connected via the 500435.

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1. Introduction

1.1 Introduction to the 500435

The 500435 is a compact scaler switcher with 5 video inputs (3 HDMI, 2 VGA) and 6 audio inputs (3 HDMI audio & 2 VGA audio switched following the video; 1 MIC audio input). The VGA input supports VGA, Component Video (YPbPr) and Composite Video.

The 500435 scales & switches any video signal to HDMI output and HDBaseT output for a transmission up to 70 m over a Cat5e/6 with PoC support.

With 1 IR Sensor, 5 IR Emitters and 1 RS232 ports, bidirectional IR & RS232 signals can be transmitted simultaneously between the 500435 and the HDMI Extender PoC/PoE Receiver.

1.2 Features

- Supports video source auto-switching function
- Bi-directional IR & RS232 control
- Supports HDMI, VGA, Composite Video, and Component Video (YPbPr)
- Output resolutions selectable (1920x1200, 1920x1080, 1600x1200, 1360x768, 1280x800, 1280x720, 1024x768)
- Supports CEC, with commands to enable/disable this function
- Compliant with HDCP
- Supports online software upgrading
- MIC port supports balance/unbalance signal, and suppresses the external noise effectively
- 48V phantom power option to support condenser microphone
- 3-level MIC input, supports condenser microphone, dynamic microphone and wireless microphone
- Controllable via button, IR & RS232
- Powerful OSD function

1.3 Package Contents

- One (1) 5x1 HDMI / HDBT Multimedia Presentation Switch
- Two (2) Mounting wall brackets
- Four (4) Black screws
- Seven (7) Captive screw connectors
- One (1) IR Sensor (with carrier wave)
- One (1) IR Emitter
- Two (2) VGA to Component Video (YPbPr) or Composite Video cables

- Two (2) RS232 cable
- Four (4) Plastic cushions with black screws
- One (1) IR remote (Two AAA batteries needed, not included)
- One (1) 12VDC, 2A Power Adapter with interchangeable blades
- One (1) User Manual

Notes: Please confirm if the product and the accessories are all included, if not, please contact your dealer.

2. Specification

Environment	HDMI 1.3
Devices	DVD, plasma, projectors, monitors, TV, PC, laptops, servers supporting HDMI
Transmission	Transparent to the user
Video Bandwidth	HDMI: 4.96 Gbps Composite Video:150MHz Component Video (YPbPr): 170MHz VGA: 375MHz
Maximum Pixel Clock	165 MHz
Video Impedance	75 Ω
Video Resolution	1920x1200, 1920x1080, 1600x1200, 1360x768, 1280x800, 1280x720, 1024x768
Audio Frequency Response	20Hz to 20KHz
Audio Impedance	Input: >10kΩ Output: 70 Ω
Stereo Channel Separation	>80dB @1KHz
Signals	HDMI 1.3 protocol and HDCP

Connectors	Four (4) HDMI receptacles; Three (3) Inputs & One (1) Output. Two (2) VGA HD-15 receptacles (Inputs). One (1) RJ45 for HDBT (output). Six (6) 3-pin terminal block (3.81 mm) for Audio; Five (5) Inputs & one (1) Output. One (1) 3-pin terminal block (3.81 mm) for the microphone. Five (5) IR Emitter 3.5mm Mono jacks. One (1) IR Sensor 3.5mm Stereo jack. One (1) 3-pin terminal block (3.81 mm) for RS232. One (1) 2.1mm barrel jack for Power. One (1) USB Type A. *Note: HDMI cables not included.*
Maximum Distance *Based on a maximum length of 6.6 ft. (2 m) of HDMI cable per end.*	Cat 5e/6: 230 ft (70 m) up to 1080p *Note: When installed in an electrically noisy environment, an STP cable must be used. Also, cross-connection reduces the effective distance depending on the grade of twisted cable used.*
Cable	One (1) Cat 5e/6 or better twisted pair cable required
Compatible Receiver	500451-RX (No Serial Port, No PoE) 500454-RX (With Serial Port, No PoE) 500454-POE-RX (With Serial Port and PoE)
Power Supply	One (1) 110-240V/12VDC power supply with interchangeable blades
Power Consumption	8 Watts for the 500435 alone. 16 Watts when the 500435 provides PoE power to the HDMI Extender Receivers.
Temperature	Operating: 0° to 40°C Storage: -20° to 85°C Humidity: Up to 95% non-condensing
Enclosure	Metal
Dimensions	8.66" x 1.73" x 5.83" (220 x 44 x 148 mm)
Weight	0.65 kg
Compliance	Regulatory: FCC, CE, RoHS
Warranty	2 years
Order Information	500435 5x1 HDMI / HDBT Multimedia Presentation Switch

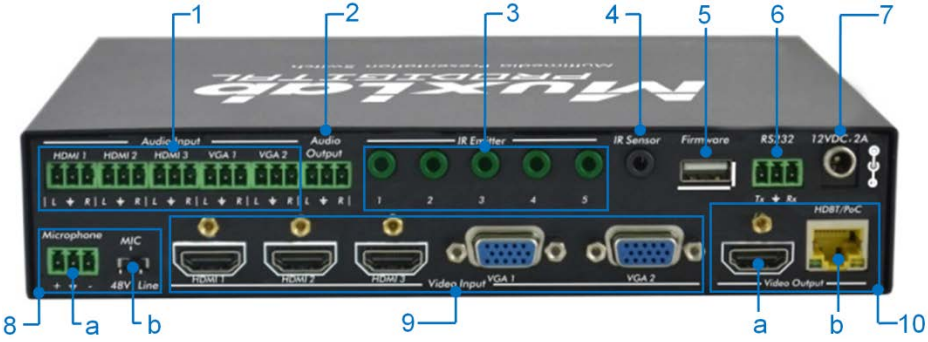
3. Panel Description

3.1 The 500435 Front Panel

No.	Name	Description
1	Power indicator	Turns on red when power is on, turns green in standby mode.
2	LCD screen	Shows real-time system working status.
3	Source/Auto	• Used as video source selection button, press to select one source, press again to select next source, switching circularly between HDMI1, HDMI2, HDMI3, VGA1 and VGA2. The LCD screen will show the name of selected source. • Used as switching mode selection button, press and hold for **7 seconds or more** to enter the Auto-switching mode, press and hold for **7 seconds or more** again to enter the Manual-switching mode. **Note:** When setting any VGA port to AV or YPbPr in Manual-switching mode, the system will not be able detect video and to enter the Auto-switching mode. While in Auto-switching mode, setting any VGA port to AV or YPbPr will automatically revert to Manual-switching mode, and the LCD screen and RS232 control software will prompt "Not supported!".
4	Enter	Confirm selection in menu.

No.	Name	Description
5	Resolution/Auto	• Used as output resolution manual switching button, select among 1920x1200, 1920x1080, 1600x1200, 1360x768, 1280x800, 1280x720, 1024x768. • Used as output resolution switching mode selection button, press and hold for **7 seconds or more** to enter in Auto-switching mode, press and hold for **7 seconds or more** again to enter the Manual-switching mode.
6	Menu	• Used as menu button, press to enter the OSD menu. • Used as software updating button, press and hold for **7 seconds or more** to enter the software updating procedure.
7	VOL-	• Used as volume down button. • Used as direction button NEXT in menus.
8	MIC+	• Used as MIC volume up button. • Used as direction button MOVE UP in menus.
9	VOL+	• Used as volume up button. • Used as direction button PREVIOUS in menus.
10	MIC-	• Used as MIC volume down button. • Used as direction button MOVE DOWN in menus.

3.2 The 500435 Rear Panel



No.	Name	Description
1	Audio Input	Includes 3 HDMI audio & 2 VGA audio inputs User can choose embedded HDMI audio or external input audio for HDMI audio input. It is controllable by RS232 commands.
2	Audio Output	Audio output port, the audio comes from the input audio corresponding to the selected video source and mixed with MIC audio.
3	IR Emitter	Five IR Emitter ports connect with IR emitters to control local source devices or the 500435 from remote, switched along with the corresponding video source.
4	IR Sensor	Connects with IR Sensor (with carrier wave only), to receive IR signal sent by the IR remote or remote controller of other input/output device.
5	Firmware	This USB port connects with USB flash disk or other storage device loaded with the firmware update file, to update the system firmware.
6	RS232	This Serial control port, 3-pin terminal block connector, connects to a control device (such as a computer) to control the 500435 or other devices connected with HDMI Extender Receivers.
7	12VDC, 2A	Power port, connects with 12V DC power adapter.

No.	Name	Description
8	Microphone	**a)** Microphone port: Connects to a microphone **b)** Switch that Includes 3 levels: (1) 48V phantom power mode (connect with condenser microphone), (2) MIC mode (connect with dynamic microphone) and (3) LINE mode (connect with wireless microphone or line audio).
9	Video Input	Video input ports, include 3 HDMI inputs & 2 VGA inputs. VGA ports support YPbPr, Composite video and VGA format. Factory default is VGA format.
10	Video Output	**a)** HDMI local output **b)** HDBaseT output, support PoC/PoE. Both HDMI and HDBT ports share the same audio signal. The audio signal is mixed with MIC audio and HDMI embedded audio (output audio). If the HDMI embedded audio output is disabled, then there will be no audio present on these ports.

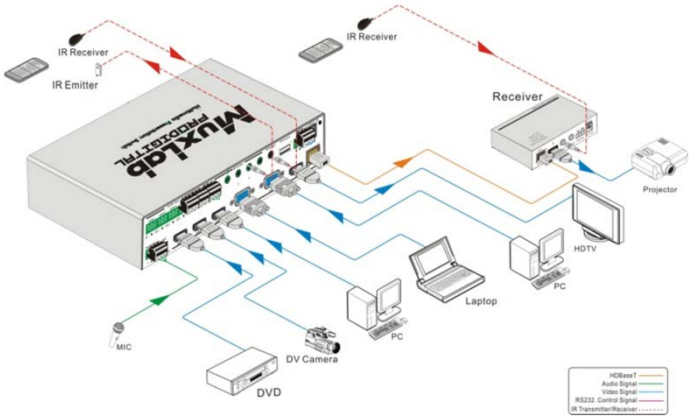
4. System Connection

4.1 Safety Precautions

1) System should be installed in a clean environment with temperature and humidity within the operating levels.

2) All devices should be connected before power on.

4.2 System Diagram



4.3 Connection Procedure

a) Connect HDMI source devices (e.g. Blue-ray DVD) to HDMI input ports of the 500435 with HDMI cables. Connect VGA source devices (e.g. PC) to VGA input ports of the 500435 with VGA cables.

b) Connect audio sources to corresponding Audio Input ports on the 500435 with audio cable. The audio of HDMI can be selected from the embedded audio or from the external audio.

c) Connect an HDMI display device to the HDMI output port of the 500435 with HDMI cable.

d) Connect HDMI Extender PoC/PoE Receiver to the HDBaseT output port of the 500435 with a twisted pair Cat5e/6 cable.

e) Connect speakers, headphones or an amplifier to the Audio Output port of the 500435.

f) Connect control device (e.g. PC) to the RS232 port of the 500435; or to the HDMI Extender PoC/PoE Receiver (with bidirectional RS232 control).

g) Both the 500435 and the HDMI Extender PoC/PoE Receiver have IR sensors and emitters. When one end is connected with IR sensor, the other end should be connected with an IR emitter.

- **For example**: When an "IR Sensor" of the 500435 connects to an IR Sensor, the IR Emitter must be connected to IR Emitter port of HDMI Extender PoC/PoE Receiver.
- The IR signal can be transmitted in both directions simultaneously between the 500435 and the HDMI Extender PoC/PoE Receiver.

h) Select MIC level and connect the right microphone to Microphone input port. MIC audio will be transmitted to Audio Output port and mixed with the audio source.

i) Connect 12V DC power to the power port. The HDMI Extender PoC/PoE Receiver will get power from the 500435 via PoC/PoE function.

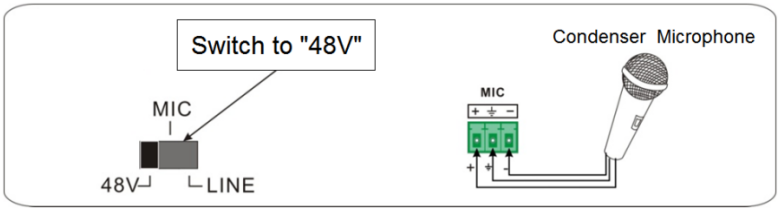
4.4 Connection of Microphone

The 500435 provides with 3-level microphone input port, to accommodate different microphone input modes, including 48V phantom power mode, MIC mode & LINE mode.

48V phantom power input:
The 48V phantom power input has a good frequency characteristic, high input impedance and high sensitivity.

When switching to "48V", the MIC input will provide a 48V phantom power. This is only used for **condenser microphones**.

Connect the microphone as follows: “+” connects to positive, “-” connects to negative and “⏚” to ground.

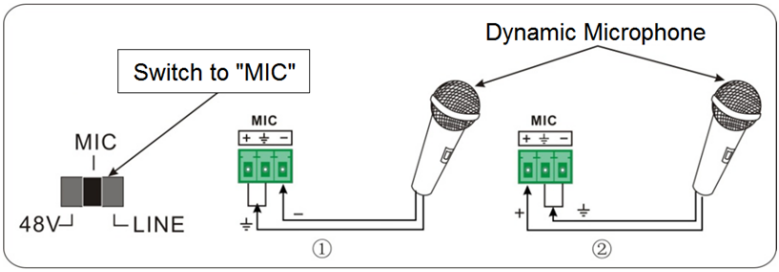


MIC input

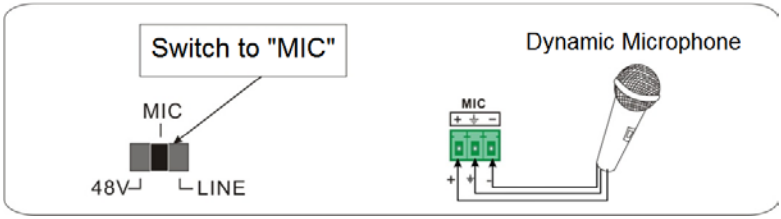
MIC input has a low frequency characteristic, and a wide frequency response.

When switched to “MIC”, the microphone input is used for connecting with a **dynamic microphone**. There are two different connection methods:

1) Unbalanced connection:
“+” and “⏚” connect to ground, and “-” connects to signal.
“-” and “⏚” connect to ground, and “+” connects to signal.



2) Balanced connection: “+” connects to positive, “-” connects to negative and “⏚” connects to ground.

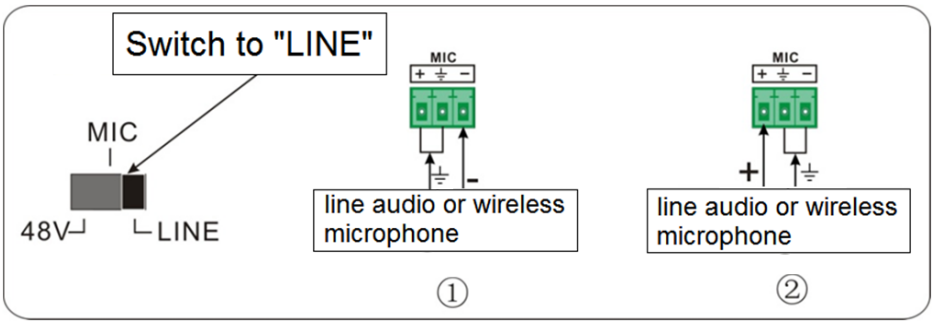


LINE input

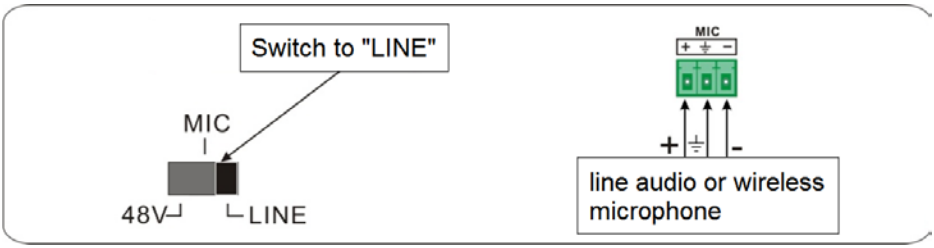
LINE input has a low frequency characteristic, and a wide frequency response.

When switched to “LINE”, the microphone input is used for connecting with line audio or wireless microphone output. There are two different connection methods:

1) Unbalanced connection:
"+" and "⏚" connect to ground, and "-" connects to signal.
"-" and "⏚" connect to ground, and "+" connects to signal.



2) Balanced connection: "+" connects to positive, "-" connects to negative and "⏚" connects to ground.



4.5 Application

The 500435 product can be used in multiple applications, such as computer realm, monitoring, conference room, big screen display, television education, command & control center, smart home, etc.

5. Operations

5.1 Operations of Front Panel Buttons

Front panel buttons can be used for adjusting output resolution, switching operations, software updating, volume adjusting and other operations in the menus.

5.1.1 Adjusting Resolution

There are two modes available: auto-adjust and manual-adjust. Press and hold the **Resolution/Auto** button for **7 seconds or more** to switch between auto-adjust and manual-adjust modes.

Note:

1) In auto-adjust mode, the 500435 will choose the resolution of the display device at the far-end as the preferred resolution. If you need to choose the resolution of a local HDMI display device, follow the steps below:

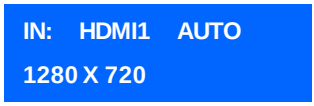
- Turn off the power of the 500435 and disconnect the HDMI Extender PoC/PoE Receiver.
- Turn on the power of the 500435.
- The 500435 gets the resolution of the local HDMI output device.
- Connect the HDMI Extender PoC/PoE Receiver to the 500435.

2) In auto-switch mode, the front panel button control is not active, but it is possible to switch modes from the IR or RS232 controls.

5.1.2 Switching Operations

Video signals support auto-switching and manual-switching. Press and hold **Source/Auto** button for **7 seconds or more** to enter the auto-switching or the manual-switching mode.

The display result is showed as below:



The display result will be showed for **2 seconds**.

Auto-switching function:

The auto-switching function works as follows:

New input

When a new input signal is detected, the 500435 will switch to this new signal automatically.

Signal loss

When the current display signal is lost, the 500435 will detect other input signals with priority from INPUT 1 to INPUT 5. It will detect the first signal and switch it to the output devices.

Power reboot

The 500435 offers the function to remember the last displayed signal when rebooting. Once rebooted, the 500435 will automatically enter auto-switching mode, and then detect all inputs and memorize their connection status for future rebooting.

If the last displayed signal is still available, the 500435 will output that signal. If not, there will be no signal on output devices.

Note: Auto-switching function works only when a new signal is detected, when a signal lost or when rebooting the unit. When any VGA input port is set to AV or YPbPr, the system will always stay in Manual-switching mode.

Operation Examples:

- Connect Input 2, Input 4, and Input 5 ports with source devices, select Input 4.
- Press and hold **Source/Auto** button for **7 seconds or more** to enter the auto-switching mode.
- The 500435 is now in auto-switching mode. If there is no signal loss or no new input, the Output will still be connected to Input 4.
- Connect Input 3 with an active source device; the outputs will automatically connect to Input 3.
- Remove the signal of Input 3; the 500435 will detect from Input 1 to Input 5, and will automatically switch to Input 2.
- Turn off the power of the 500435. As the 500435 is in auto-switching mode, it will choose Input 2 to output when power is restored.

5.1.3 Adjusting the Volume

When not in OSD menu, press VOL – to decrease line volume, VOL + to increase line volume; press MIC – to decrease MIC volume, MIC + to increase MIC volume.

5.1.4 On-Screen Display (OSD) Menu

Press **Menu** button to enter the OSD menu. Use **Up**, **Down**, **Left**, **Right** buttons to navigate, and press **Enter** to confirm your selection. The **Menu** button also can be used to exit present menu and go to the previous menu level by level until you exit the OSD.

5.1.5 Software update:

The firmware of the 500435 can be updated via USB flash disk.

Procedures:

1) Copy the file "**MERGE_51T.bin**" to the root directory of a USB flash disk. (Make sure the file is copied to the root directory for normal use. The "**MERGE_51T.bin**" file is provided by MuxLab and is available on our website: http://www.muxlab.com).

2) Plug the USB flash disk to the 500435 USB port on its front panel.

3) Press the **Menu** button for **7 seconds or more** to update the software automatically.

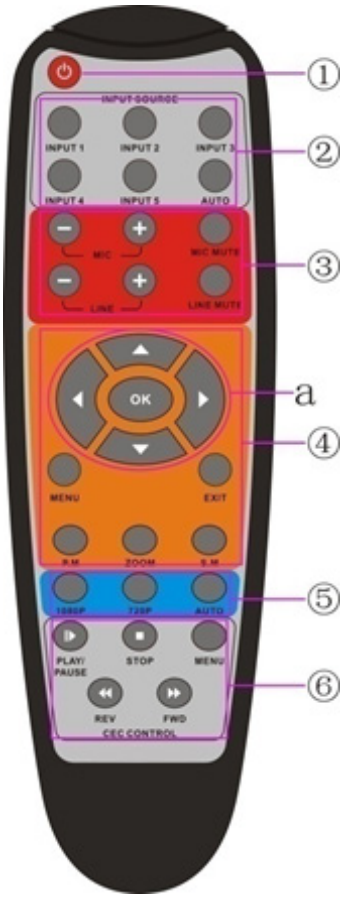
You can also press the **Menu** button for **1 second** to enter the OSD menu, go to "Option"→ Select "Software Update" to enter the update procedure.

Or you can send the command **50689%**via the RS232 port to update the software.

5.2 Operations of IR

5.2.1 IR Remote

As IR signal can be transmitted in both directions between the 500435 and the HDMI Extender PoC/PoE Receiver, it is able to use the IR remote at the far-end to control the 500435 or HDMI source devices (via CEC function buttons).



1. **Power button**

   Enter/exit power standbymode

2. **Input channel selection buttons**

   Input 1 is for HDMI1, Input 2 for HDMI2…and Input 5 for VGA2.
   AUTO: Enable/ disable auto-switching mode.

3. **Volume adjusting buttons**

   MIC-/+: increase/ decrease MIC volume
   LINE-/+: increase/ decrease line volume
   MIC MUTE: mute/ unmute MIC audio
   LINE MUTE: mute/ unmute line audio

4. **Menu operation buttons**

   MENU: press to enter the OSD menu or to return to previous menu.

   EXIT: exit OSD menu.

   OK: confirm button.

   ▲,▼,◀, ▶: UP/DOWN/LEFT/ RIGHT buttons, for value setting or page-turn.

   Buttons in area "**a**" are also used in CEC mode to enter the menu of the HDMI source device.
   P.P, ZOOM, S.M: shortcut button, to select display mode.

5. **Resolution selection buttons**

   Select resolution bypressing the corresponding button.
   AUTO: Enable / disable auto-switching mode.

6. **CEC function buttons**

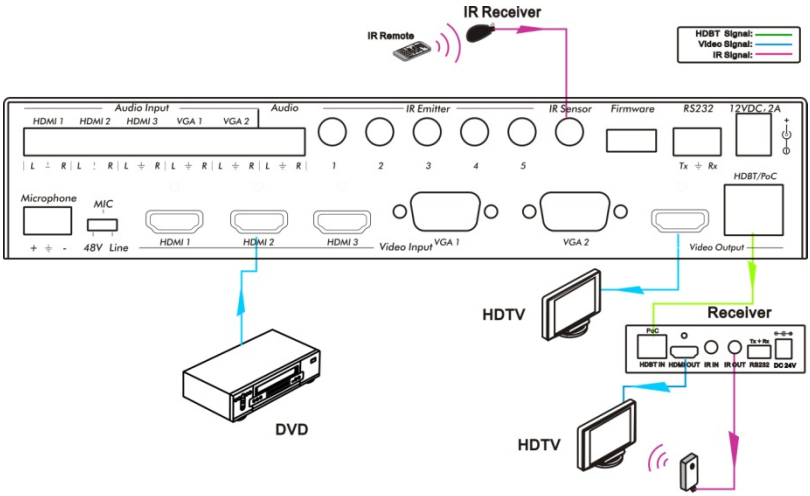
   For HDMI devices which supports CEC. It includes PLAY, PAUSE, STOP, MENU, REV (reverse) and FWD (forward).

5.2.2 IR Operations

The 5 IR Emitter ports correspond to the 5 video inputs respectively, and the IR signals are switched following the corresponding video source.

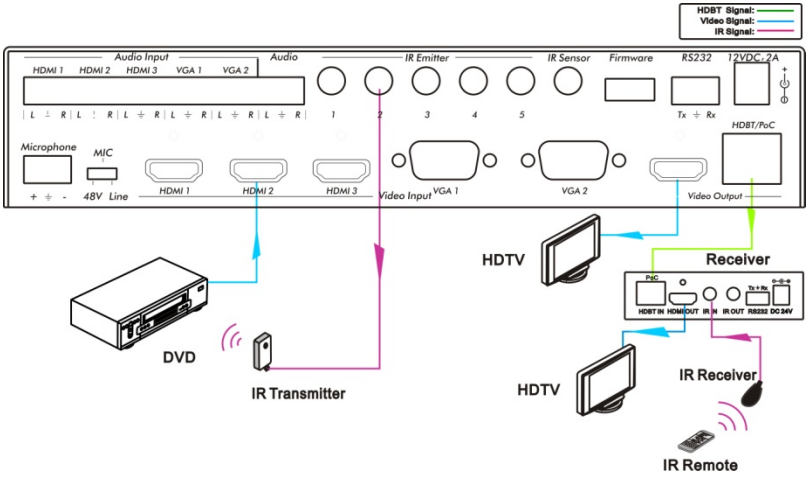
1) Control far-end device from local

From the 500435, you can control the far-end display device locally with the corresponding IR remote.



2) Control local device from remote

You can control the source device or the 500435 locally with corresponding IR remote.



5.3 Operations of CEC Function

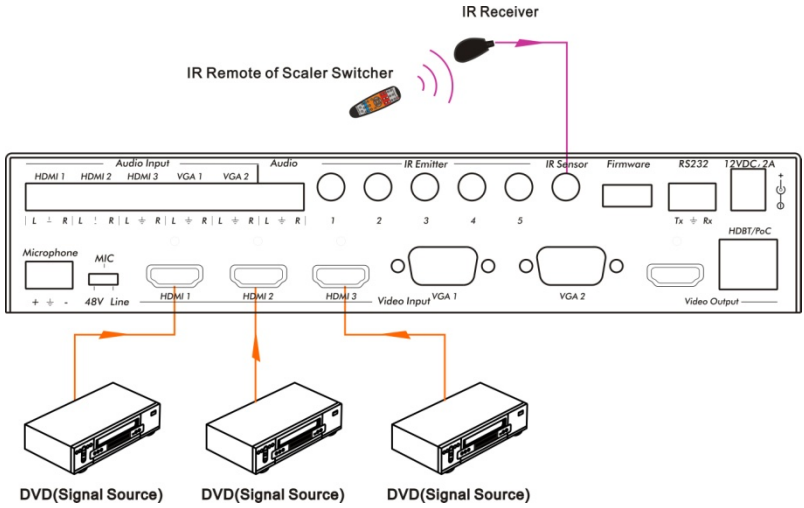
The 500435 supports CEC function. This function can be turned on/ off by software commands (RS232) or by OSD menu operations. The factory default setting is ON.

Software CEC commands are: “50686%” (enable CEC) and “50687%” (disable CEC).

HDMI Input ports 1~3 support CEC, if the connected source devices also support CEC and their CEC functions are enabled, you can control the source device via the IR remote of the 500435.

The working status related to CEC and STANDBY is showed as below:

Situation	Working Status
CEC: on, Standby: on	Press STANDBY button on the IR remote, the 500435 enters the Standby mode, so do all the CEC enabled HDMI source devices. Press STANDBY button again on the IR remote, the 500435 exits the standby mode, the CEC enabled HDMI source devices also exit the standby mode.
CEC: on, Standby: off	Press STANDBY button on the IR remote, The 500435 enters the Standby mode, HDMI1~3 source devices stay On.
CEC: on	Use CEC function buttons, ▲, ▼, ◀, ▶, **OK**, Play, Pause, Fast Forward, and Reverse buttons on the IR remote to control the HDMI source devices
CEC: off	Disables all CEC functions.



CEC: Control HDMI source devices by IR remote

5.4 Operations of RS232 Control

Since RS232 can be transmitted in both directions between the 500435 and the HDMI Extender PoC/PoE Receiver, you are able to control a third party RS232 device locally or control the 500435 remotely. For compatibility with third party RS232 devices, the baud rate of the devices should be 2400, 4800, 9600, 19200, 38400, 57600 or 115200.

You can use a terminal software to control 500435. Please set the parameters of the COM Port (baud rate, data bit, stop bit and the parity bit) to 9600, 8, 1, none.

5.4.1 RS232 Communication Commands

Communication protocol: RS232 Communication Protocol
(Baud rate: 9600, Data bit: 8, Stop bit: 1, Parity bit: none)

Command	Function	Feedback Example
Switch Commands		
50701%	Switch to HDMI 1 input	Switch to HDMI 1
50702%	Switch to HDMI 2 input	Switch to HDMI 2
50703%	Switch to HDMI 3 input	Switch to HDMI 3
50704%	Switch to VGA 1/YPbPr 1/AV 1 input	Switch to VGA 1/YPbPr 1/AV 1
50705%	Switch to VGA 2/YPbPr 2/AV 2 input	Switch to VGA 2/YPbPr 2/AV 2
50680%	Select VGA 1 for INPUT 4	Input 4 Set & Switch to VGA 1
50681%	Select YPbPr 1 for INPUT 4	Input 4 Set & Switch to YPbPr1
50682%	Select AV 1 for INPUT 4	Input 4 Set & Switch to AV 1
50683%	Select VGA 2 for INPUT 5	Input 5 Set & Switch to VGA 2
50684%	Select YPbPr 2 for INPUT 5	Input 5 Set & Switch to YPbPr 2
50685%	Select AV 2 for INPUT 5	Input 5 Set & Switch to AV 2
50785%	Enable auto-switching	Auto Switching
50786%	Disable auto-switching	Manual Switching
Audio Commands		
50600%	MUTE line audio	LINE Mute
50601%	Unmute line audio	LINE Unmute
50602%	Line audio volume up	LINE Volume: xx (xx=0~60)
50603%	Line audio volume down	LINE Volume: xx (xx=0~60)
50720%	Mute LINE audio & MIC audio	LINE Mute
		MIC Mute

Command	Function	Feedback Example
50721%	Unmute LINE audio & MIC audio	LINE Unmute
		MIC Unmute
50722%	Mute MIC audio	MIC Mute
50723%	Unmute MIC audio	MIC Unmute
50694%	Enable MIC precedence	MIC precedence: enable
50695%	Disable MIC precedence	MIC precedence: disable
50696%	Check MIC precedence status	MIC precedence: XXXX (XXXX= enable / disable)
50724%	MIC volume up	MIC Volume: xx (xx=0~60)
50725%	MIC volume down	MIC Volume: xx (xx=0~60)
508xx%	Set MIC volume	MIC Volume: xx (xx=0~60)
50706%	Choose embedded audio as HDMI 1 audio input	HDMI 1 Audio from Embedded
50707%	Choose external audio as HDMI 1 audio input	HDMI 1 Audio from LINE
50708%	Choose embedded audio as HDMI 2 audio input	HDMI 2 Audio from Embedded
50709%	Choose external audio as HDMI 2 audio input	HDMI 2 Audio from LINE
50710%	Choose embedded audio as HDMI 3 audio input	HDMI 3 Audio from Embedded
50711%	Choose external audio as HDMI 3 audio input	HDMI 3 Audio from LINE
Resolution Commands		
50619%	Change resolution to 1360x768 HD	Resolution: 1360x768
50626%	Change resolution to 1024x768 XGA	Resolution: 1024x768
50627%	Change resolution to 1280x720 720p	Resolution: 1280x720
50628%	Change resolution to 1280x800 WXGA	Resolution: 1280x800

Command	Function	Feedback Example
50629%	Change resolution to 1920x1080 1080p	Resolution: 1920x1080
50620%	Change resolution to1920x1200 WUXGA	Resolution: 1920x1200
50621%	Change resolution to1600x1200 UXGA	Resolution: 1600x1200
Setup Commands		
50604%	Lock the front panel buttons	Front Panel lock
50605%	Unlock the front panel buttons	Front Panel Unlock
501xx%	Set the volume to xx.	LINE Volume: xx (xx=0~60)
502xx%	Set the brightness to xx.	Brightness: xx (xx=0~99)
503xx%	Set the contrast to xx.	Contrast: xx (xx=0~99)
504xx%	Set the saturation to xx.	Saturation: xx (xx=0~99)
505xx%	Set the sharpness to xx.	Sharpness: xx (xx=0~99)
50607%	Adjust the color temperature	Color Temperature: xx (xx= Cool/ Medium/ Warm/ User.)
50608%	Set the aspect ratio	Aspect Ratio: xx (xx= 16:9/ 4:3/ auto/ panorama/ justscan/ zoom1/ zoom2, when the input source is VGA format, xx can only be 4:3, 16:9 or Panorama)
50614%	Set the picture mode	Picture Mode: xx (xx= Dynamic/ Standard/ Mild/ User)
50615%	Set SM audio mode	Sound Mode: xx (xx= Standard/ Music/ Movie/ Sports/ User)
50655%	Freeze output image	Freeze: enable
50656%	Cancel the freezing of output image	Freeze: disable
50646%	Enable MIC Volume Icon display	Volume Icon: enable
50647%	Disable MIC Volume Icon display	Volume Icon: disable
50648%	Enable HDMI embedded audio output	Embedded Audio Output: enable

Command	Function	Feedback Example
50649%	Disable HDMI embedded audio output	Embedded Audio Output: disable
50761%	Not display mute icon of LINE audio	LINE Mute Icon: disable
50762%	Display mute icon of LINE audio	LINE Mute Icon: enable
50763%	Not display mute icon of MIC audio	MIC Mute Icon: disable
50764%	Display mute icon of MIC audio	MIC Mute Icon: enable
50765%	Display freeze icon	Freeze Icon: enable
50766%	Not display freeze icon	Freeze Icon: disable
50644%	Display channel status	Input Icon: enable
50645%	Not display channel status	Input Icon: disable
50650%	Check the channel status	Input Icon: xx
50606%	Auto-adjust the input parameter (VGA only)	VGA Input Auto
50699%	Check the system version	Version Vx.x.x
50688%	Enable MIC noise detecting	MIC detect: enable
50689%	Disable MIC noise detecting	MIC detect: disable
50690%	Check MIC noise detecting status	MIC detect: XXXX
50791%	HDCP Active	HDCP Active
50792%	HDCP Manual	HDCP Manual
50793%	Enable HDCP output	HDCP ON
50794%	Disable HDCP output	HDCP OFF
50795%	Inquire HDCP/ Active HDCP	HDCP Active
	Inquire HDCP/ Manual HDCP	HDCP Manual
		HDCP OFF/ON
50767%	Restore default EDID	EDID: initial
50768%	Bypass EDID data from output to input	EDID: bypass
50769%	Upload custom EDID data to the switcher	EDID: user
50770%	Inquire EDID status	EDID: initial EDID: bypass EDID: user

Command	Function	Feedback Example
50782%	EDID management, copy the best resolution data of one output to HDMI input	Manage HDMI input with preferred timing
		Resolution:1920x1080
50787%	Enable serial control mode 1: control product& far-end from local RS232	RS232 Mode 1: RS232 Control Scaler & Remote
50788%	Enable serial control mode 2: control product from local RS232 and far-end)	RS232 Mode 2: RS232 & Remote Control Scaler
50697%	Exit standby mode	Wake up!
50797%	Enter standby mode	Go to standby!
50698%	Software update	
50617%	Reset to factory defaults	Factory Reset
Menu Commands		
50609%	OK for OSD selection	Key: ok
50610%	LEFT button	Key: left
50611%	RIGHT button	Key: right
50612%	UP button	Key: up
50613%	DOWN button	Key: down
50616%	MENU button (enter OSD)	OSD: Enter
50618%	EXIT button (exit OSD)	OSD: Exit
Inquire Commands		
50630%	Check the volume level	LINE Volume: xx (xx=0~66)
		MIC Volume: xx (xx=0~66)
50631%	Check the input source	Input: xx (xx=HDMI1/ HDMI2/ HDMI3/ VGA1/ VGA2/ YPbPr1/ YPbPr2/ AV1/ AV2)
50632%	Check the output resolution	Resolution: xx (xx=1920×1200/ 1920×1080/ 1600×1200/ 1360×768/ 1280×800/ 1280×720/ 1024×768

Command	Function	Feedback Example
50633%	Check the image mode	Picture Mode: xx (xx= Dynamic/ Standard/ Mild/ User)
50634%	Check the audio mode	Sound Mode: xx (xx= Standard/ Music/ Movie/ Sports/ User)
50635%	Check the image aspect ratio	Aspect Ratio: xx (xx= 16:9/ 4:3/ auto/ panorama/ justscan/ zoom1/ zoom2, when the input source is VGA format, xx can only be 4:3, 16:9 or Panorama)
50636%	Check the brightness	Brightness: xx (xx=0~99)
50637%	Check the contrast	Contrast: xx (xx=0~99)
50638%	Check the saturation	Saturation: xx (xx=0~99)
50639%	Check sharpness	Sharpness: xx (xx=0~99)
50640%	Check the color temperature	Color Temperature: xx (xx= Cool/Medium/Warm/User.)
50651%	Check Volume Icon display status	Volume Icon: xxxx
50652%	Check Digital audio output status	Embedded Audio Output: enable/disable
50712%	Check the audio input sources for HDMI 1, 2, 3	HDMI1 Audio from XXXX port
		HDMI2 Audio from XXXX port
		HDMI3 Audio from XXXX port
50751%	Check whether the LINE audio is mute or not	LINE Mute/Unmute
50752%	Check whether the MIC audio is mute or not	MIC Mute/Unmute
50753%	Check the freeze status	Freeze: enable/disable
50754%	Check the panel lock status	Front Panel Lock/UnLock

Command	Function	Feedback Example
50783%	Displaystatus including MIC, LINE audio, Resolution, Output Audio on/off, Manual/ Auto-switching modes	Line Volume:XX
		Mic Volume:XX
		Input:XXXX
		Resolution:XXXX
		Digital Sound Ouput: XXXX
		Switch status: XXXX
Adjustment Commands		
50678%	Enable screen output adjusting	Enter Output Position Adjust
50679%	Disable screen output adjusting	Exit Output Position Adjust
50670%	Move the image to left	Output Position Adjust X xx
50671%	Move the image to right	Output Position Adjust X xx
50672%	Move the image up	Output Position Adjust Y XX
50673%	Move the image down	Output Position Adjust Y xx
50674%	Stretch left from left side (increase image width)	Output Width Adjust xx
50675%	Pull right from left side (decrease image width)	Output Width Adjust xx
50676%	Stretch upwards from bottom side (decrease image height)	Output Height Adjust xx
50677%	Stretch downwards from bottom side (increase image height)	Output Height Adjust xx
CEC Commands		
50687%	Disable CEC	HDMI CEC OFF
50686%	Enable CEC	HDMI CEC ON
50901%	Play&pause	CEC cmd: play&pause
50902%	Stop	CEC cmd: stop
50903%	Menu	CEC cmd: menu
50904%	Retreat	CEC cmd: rev
50905%	Forward	CEC cmd: fwd
50906%	Up	CEC cmd: up

Command	Function	Feedback Example
50907%	Down	CEC cmd: down
50908%	Left	CEC cmd: left
50909%	Right	CEC cmd: right
50910%	Confirm command	CEC cmd: select
50911%	Exit command	CEC cmd: exit

Note:

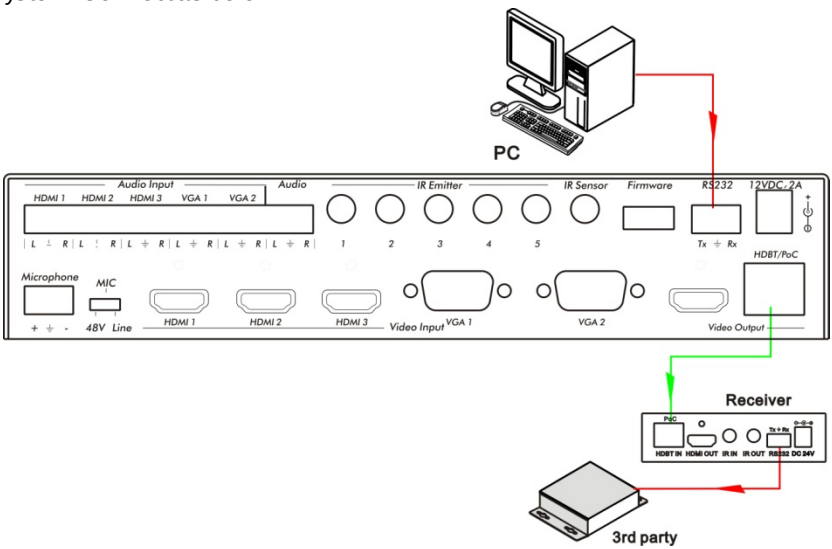
1. Turn on/ off HDCP auto-management by sending serial commands.
   a) When HDCP is set to Active, the output HDCP status follows the input source. If the input source is with HDCP, so is the output and vice versa.
   b) When HDCP is set to Manual, the output HDCP status follows the status of HDCP. If the HDCP is turned off, then the output is without HDCP.
2. Screen output adjusting is available only when the screen output adjusting is on. Send command 50678% to turn on.
3. CEC commands with grey background are available only when CEC is on.
4. MIC precedence: In Mute mode, if the MIC noise detecting is on, the device will unmute MIC automatically given the outer noise exceeds the limit of noise detecting. Send the 50696% command to enable MIC precedence; then the device will not be able to change the mute mode no matter how loud the noise is.

5.4.2 Control the 500435 or 3rd Party Device locally

First, connect the RS232 port of the 500435 to the RS232 port of the PC.

Then, send the **50787%** command (Serial control mode 1, factory default) via RS232 communication software.

Finally, send a command to the 500435 or to other remote RS232 device connected in the system. Connect as below:



Control the 500435 or 3rd party device from local

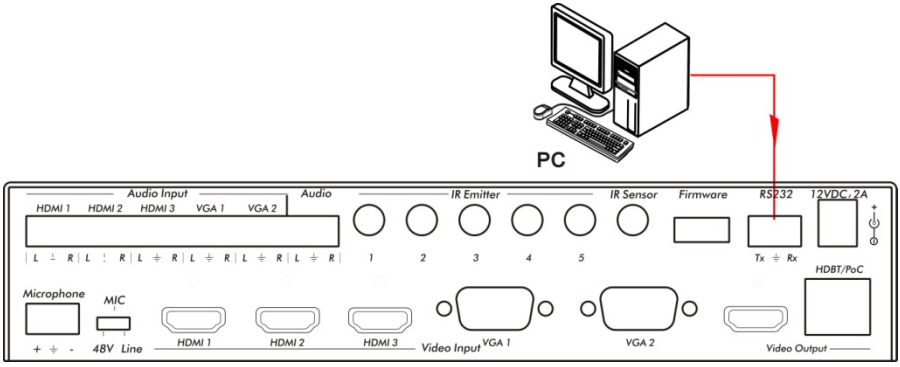
5.4.3 Control the 500435 locally or remotely

1. Control the 500435 locally

First, connect the RS232 port of the 500435 to the RS232 port of the PC.

Then, send the **50788%** command via the RS232 communication software.

Finally, send a command to control the 500435. Connect as below:



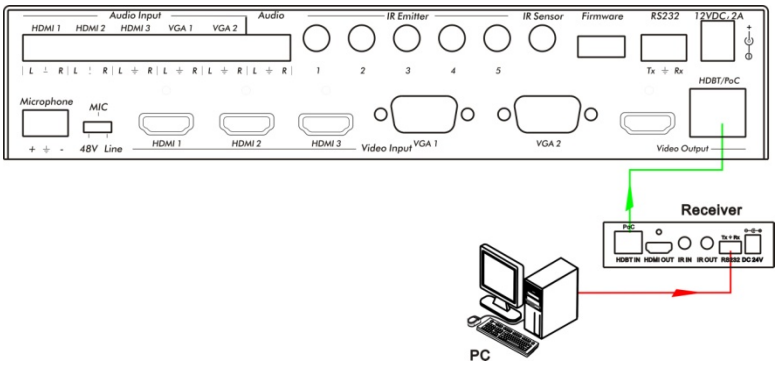
Control the 500435 from local

2. Control the 500435 remotely

First, connect the RS232 port of the far-end RS232 device to the RS232 port of the PC.

Then, send the **50788%** command via the RS232 communication software.

Finally, send a command to control the 500435. Connect as below:



Control the 500435 from remote

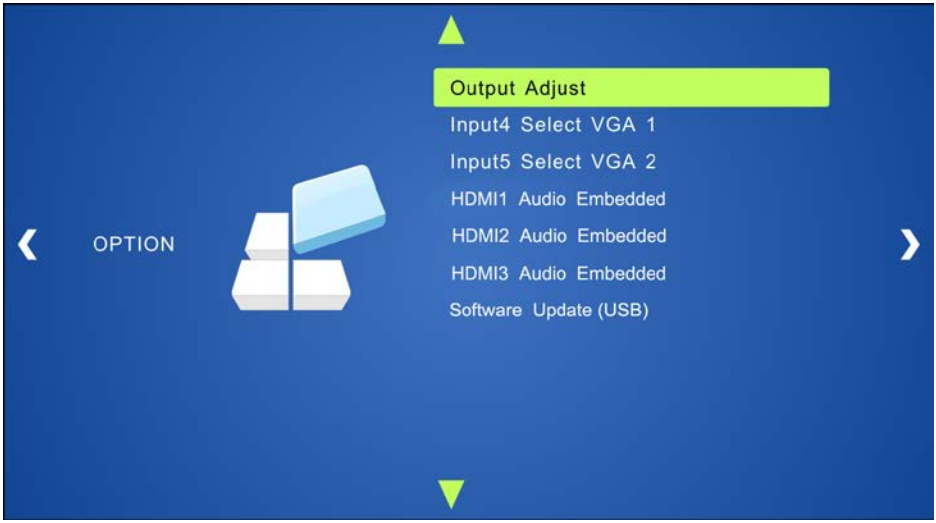
5.5 Operations in OSD Menu

The 500435 provides a powerful OSD operation menu that contains 4 sections: (1) Option settings, (2) Picture settings, (3) Sound settings and (4) System setup.

Press the MENU button on the front panel (or the MENU button on the IR remote, or send the **50616%** RS232 command) to enter the OSD menu.

5.5.1 Option

Includes Output Adjust, Input4/5 Select, HDMI1/2/3 Audio select, and Software Update (USB)



Output Adjust: Adjust output image position (X: horizontal direction and Y: vertical direction), ratio aspect (width and height), polarity adjustment (H Polarity and V Polarity) and output setting (HDMI on/off and HDBT on/off).

Input4 Select: Select video source format for VGA input, includes AV 1 (C-video signal), VGA 1 (VGA signal) and YPbPr 1 (Component video signal). Press ENTER to switch among the options, and press Input 4 on the IR remote to confirm the selection.

Input5 Select: Select video source for VGA input, includes AV 2 (C-video signal), VGA 2 (VGA signal) and YPbPr 2 (Component video signal). Press ENTER to switch among the options, and press Input 5 on the IR remote to confirm the selection.

For INPUT4 & INPUT5, when change for new format signal:

1. First, please select a format through this menu (the signal format changed while the video source is still the same).
2. Then, switch off the present signal channel (e.g. switch to another channel).
3. Finally, switch to channel INPUT4/INPUT5 again.

HDMI1 Audio Select: switch between Embedded and Line to choose the desired audio output port for HDMI1.

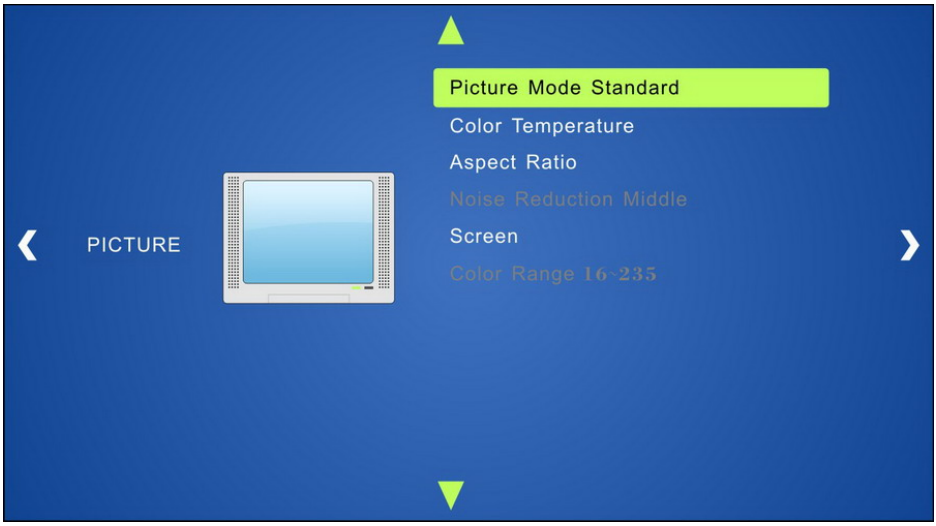
HDMI2 Audio Select: switch between Embedded and Line to choose the desired audio output port for HDMI2.

HDMI3 Audio Select: switch between Embedded and Line to choose the desired audio output port for HDMI3.

Software Update (USB): Insert the USB flash disk with updating file to USB port of 500435, to update the software.

5.5.2 Picture

Includes Picture Mode, Color Temperature, Aspect Ratio, Noise Reduction, Screen and Color Range



Picture mode: Includes Dynamic, Standard, Mild, and User. Only in User mode, will it be able to set the image contrast, brightness, color and sharpness.

Color Temperature: Includes Cool, Medium, Warm and User mode. Only in User mode, you can set values for Red, Green and Blue (RGB).

Aspect Ratio: Includes Native, 4:3, 16:9, Zoom1, Zoom2, Just Scan, and Panorama. VGA format only supports 4:3, 16:9 and Panorama.

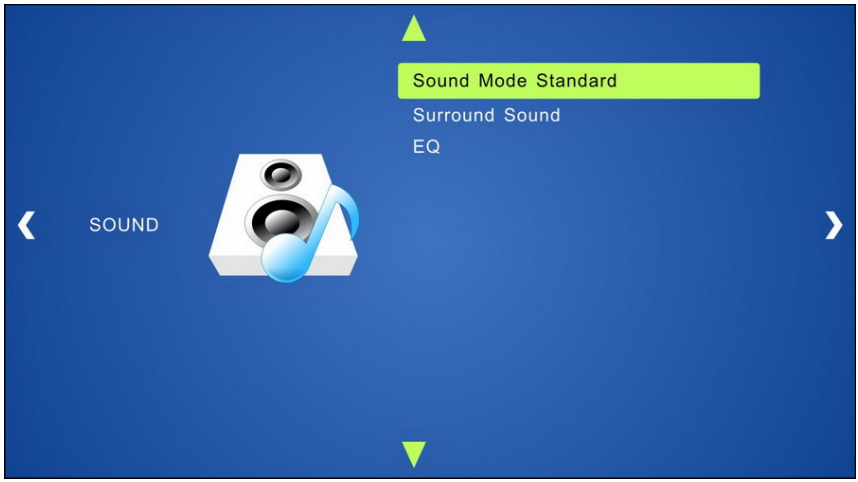
Noise Reduction (not for VGA format): Includes Off, Low, Middle, High and Default.

Screen (not for HDMI source): Includes Auto Adjust, Horizontal, Vertical, Size, and Phase.

Color Range (not for HDMI format): 16~235 or 0~255, use ENTER button to select the desired color range.

5.5.3 Sound

Includes Sound Mode, Surround Sound and EQ



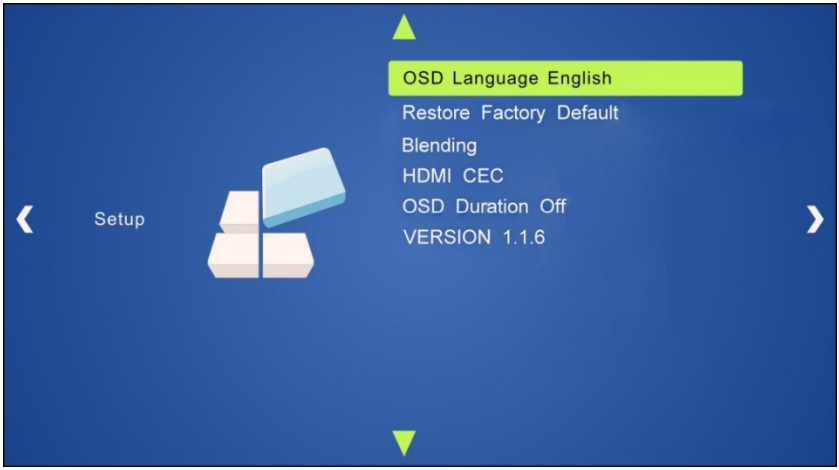
Sound mode: Includes Standard, Music, Movie, Sports and User. Only in User mode you can set treble and bass.

Surround Sound: Includes Off, Surround and SRS Trusurround XT.

EQ: To adjust the sound balance.

5.5.4 Setup

Includes OSD Language, Restore Factory Default, Blending, HDMI CEC, OSD Duration and version inquiry



OSD Language: Supports 7 languages, including English (default), Chinese etc.

Restore Factory Default: Restores to original system state.

Blending: Includes Low, Middle, High and Off. Use ENTER button to select.

HDMI CEC: Enable/disable CEC and auto-standby function. Default: CEC on, STANDBY on. Only when CEC is on, will it be able to set auto-standby status.

OSD Duration: can be set to 5 s, 10 s, 15 s and Off. "s" is for Second.

VERSION: Displays software version.

5.6 Instructions of VGA Converting Cable

As VGA source supports YPbPr and Composite video source, the 500435 provides with 2 VGA converting cables to comply with these signals.

When you need to select these signals as input sources, please switch to channel INPUT 4 or INPUT 5, and then set the signal type in the OSD menu. Then switch to another input channel and connect INPUT 4 or INPUT 5 with corresponding source device. Finally, switch to INPUT4 or INPUT 5 again.

Connect with Component Video (YPbPr) Source

There are three different ways to connect a Component Video source:

1. **From the front panel buttons & OSD**

   Press the **Menu** button on the front panel to enter the OSD, and then enter the **OPTION** setting menu: set "INPUT 4 Select" to **YPbPr1**, and "INPUT 5 Select" to **YPbPr2**. Then, press **Source/Auto** button on the front panel to switch to YPbPr1 or YPbPr2 source.

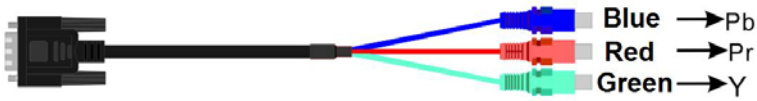
2. **Via RS232 commands**

   Send command **50681%**(or **50684%**) to switch to YPbPr1 (or YPbPr2) source.

3. **Via IR remote & OSD**

   Press **Menu** button on IR remote to enter the OSD menu, then enter the **OPTION** setting menu: set "INPUT 4 Select" to **YPbPr1**, and "INPUT 5 Select" to **YPbPr2**. After setting, press **INPUT 4** (or **INPUT 5**) button to switch to YPbPr1 (or YPbPr2) source.

The VGA cable used to convert the VGA signal to Component Video looks like this:



Connect with Composite Video Source

There are three different ways to connect a Composite Video source:

1. **From front panel buttons & OSD**

   Press the **Menu** button on the front panel to enter the OSD menu, then enter the **OPTION** setting menu: set "INPUT 4 Select" to **AV1**, and "INPUT 5 Select" to **AV2**. Finally, press **Source/Auto** button on the front panel to switch to the AV1 or the AV2 source.

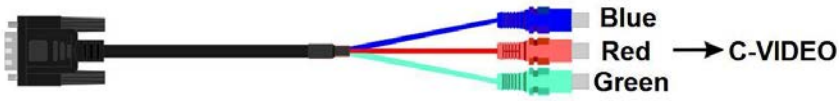
2. **Via RS232 commands**

   Send command **50682%**(or **50685%**) to switch to AV1 (or AV2) source.

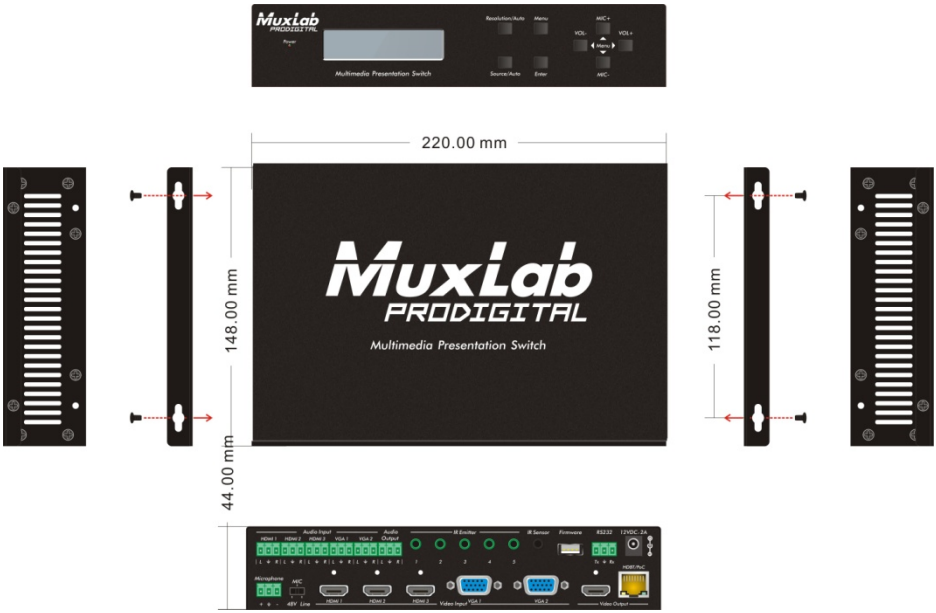
3. **Via IR remote & OSD**

   Press the **Menu** button on the IR remote to enter the OSD menu, then enter the **OPTION** setting menu: set "INPUT 4 Select" to **AV1**, and "INPUT 5 Select" to **AV2**. Finally, press **INPUT 4** (or **INPUT 5**) button to switch to AV1 (or AV2) source.

The VGA cable used to convert the VGA signal to Composite Video looks like this:



6. Panel Drawing



7. Troubleshooting & Maintenance

The following table describes some of the symptoms, probable causes and possible solutions in respect to the installation of the 500435.

Problems	Causes	Solutions
Output image with snowflakes	Bad quality of the connecting cable	Try another high quality cable.
	Failed or loose connections	Make sure the connection is good
No output image when switching	No signal at the input / output end	Check with oscilloscope or multi-meter if there is any signal at the input/ output end.
	Failed or loose connection	Make sure the connection is good
	The product is broken	Send it to authorized dealer for repairing.
POWER indicator doesn't work or doesn't respond to any operation	Failed connection of power cord.	Make sure the power cord connection is good.
EDID management does not work normally	The HDMI cable is broken at the output end.	Change for another HDMI cable which is in good working condition.
There is a blank screen on the display when switching	The display does not support the resolution of the video source.	Switch again.
		Manage the EDID data manually to make the resolution of the video source compliant with the output resolution.
Static becomes stronger when connecting the video connectors	Bad grounding	Check the grounding and make sure it is well connected.

Problems	Causes	Solutions
Cannot control the device through RS232 port	Wrong RS232 communication parameters	Type in correct RS232 communication parameters
	Broken RS232 port	Send it to authorized dealer for checking.
Cannot control the device from the front panel buttons, but can control it through RS232 port	The front panel buttons are locked	Send command **50605%** to unlock the front panel buttons.
Cannot control the device by RS232, IR remote, or front panel buttons	The device has already been broken.	Send it to authorized dealer for repair.

If you still cannot diagnose the problem, please call MuxLab Customer Technical Support at 877-689-5228 (toll-free in North America) or (+1) 514-905-0588 (International).

Regulatory Compliance

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CE/FCC & Recycling Information

CE Certification

This equipment complies with the requirements relating to Electromagnetic Compatibility Standards EN55022/EN55024 and the further Standards cited therein. It must be used with shielded cables only. It has been manufactured under the scope of RoHS compliance.

FCC Certification

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
You are cautioned that changes or modification not expressly approved by the party responsible for compliance could void your authority to operate the equipment.
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation

WEEE (Waste of Electrical and Electronic Equipment), Recycling of Electronic Products

In 2006 the European Union introduced regulations (WEEE) for the collection and recycling of all waste electrical and electronic equipment. It is no longer allowable to simply throw away electrical and electronic equipment. Instead, these products must enter the recycling process.
Each individual EU member state has implemented the WEEE regulations into national law in slightly different ways. Please follow your national law when you want to dispose of any electrical or electronic products. More details can be obtained from your national WEEE recycling agency.

CE FC

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